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The Impact of Capital Market Instruments on Malaysian Economic Growth

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***Abstract*— The relationship between capital market instruments and economic growth in countries has been quite a topic of debate and research in recent years. Financial markets, whether they are based on capital markets or banks, are essential to one nation's growth. Its major purpose of serving as the government's and enterprises' primary source of finance gives it prominence and authority. This study analyses the causal-effect relationship of stock, bond, *sukuk*, and foreign exchange markets towards Malaysian economic growth. It aims to appraise the role of capital markets instruments in advancing Malaysian economic growth using the Autoregressive distributed lag (ARDL) method. Although many have studied how capital market instruments affect economic growth, this research intends to fill the absence of that research by offering a comprehensive study on the cumulative effects of capital market instruments towards Malaysian economic growth. A thorough examination that considers the significant and positive influence of stock, bond, *Sukuk* and foreign exchange markets on Malaysian economic growth will offer a deeper knowledge of their actual meaning to economic growth and insightful analysis that will help academics, investors, and policymakers create strategies and policies that would promote Malaysia's sustainable economic growth. The findings of this study are stock, bond, *Sukuk* and foreign exchange markets have a positive impact on economic growth both in the long and short runs. On the other hand, this study found that the sum of bond and *sukuk* market is statistically significant in the short run.**

***Keywords*— Economic Growth; Capital Markets; Stock; Bond; *Sukuk*; Foreign Exchange; Unemployment Rate; ARDI**

I. INTRODUCTION

As a critical element in financing an economy's growth, capital markets facilitate risk dispersion while promoting financial stability and economic advancement. In terms of nonfinancial enterprise debt and stock financing in America alone- it accounts for about 72% [1]. Every type of instrument found in capital markets contributes uniquely to the economy as investors are able to transfer resources efficiently from the various types such as stock exchange, bond, and derivatives markets. Capital markets are closely linked to other elements of the economy. According to [51], by providing a platform for capital accumulation and potential investments, financial markets, especially capital markets, play an important role in attracting capital.

Malaysia's capital markets are essential for releasing funds for profitable ventures. They provide investors with a platform to invest their resources in stocks, bonds, and other financial instruments, which are then used to fund beneficial endeavours like company growth, infrastructure improvements, and research and development [72]. The growth of the capital

markets has a favourable impact on Malaysia's investment levels. Both local and foreign investments can be attracted to a well-run capital market with strong regulatory frameworks and effective arbitrage, promoting economic growth [35]. Through the capital market, capital is channelled into productive industries, contributing to the efficient allocation of resources. Capital markets use market demand and investor interest to meet the consumption of resources and channel funds to companies with stable growth through price mechanisms and market forces [35]. This proves that resource efficiency boosts national economic growth.

Reference [45] following their result of the study were determined to conclude that capital market integration has a positive influence on economic growth, and the key elements influencing economic growth are stock market capitalisation, capital mobility, value traded, stock indices, immigration, and, to a lesser extent, small, overseas portfolio investment. Reference [27] suggested that because capital markets are important in economic development, government policies that promote growth include the bond market, which provides funding for the socioeconomic framework Vision 2030. As a byproduct, it was found and advised that the capital market continues to be an integral aspect of any economy, playing a vital role in economic growth and promoting private sector investment in it [65].

The relationship between capital market instruments and economic growth in countries has been quite a topic of debate and research in recent years. Financial markets, whether they are based on capital markets or banks, are essential to one nation's growth [64]. Its major purpose of serving as the government's and firms' primary source of finance gives it prominence and authority.

Economic growth analysis is important for policy makers, investors, and analysts because of its far-reaching implications for policy making, investment decisions, income allocation, resource allocation and international competitiveness. Understanding the drivers of economic growth helps policymakers develop effective policies that promote sustainable and inclusive growth [46]. This knowledge helps identify key areas of focus and allocate resources more efficiently, resulting in a progressive development plan. Economic performance is a key consideration for investors when making investment decisions. High levels of economic growth mean favourable business conditions and potential returns on investment, attracting domestic and foreign investors [56].

At the same time, development policy analysis helps policymakers identify ways to ensure that the benefits of development are distributed equitably, contributing to poverty reduction. Economic development policy analyses help identify sectors or industries that generate growth and facilitate more efficient allocation of resources [40]. Understanding the drivers of productivity refers to policies aimed at enhancing overall economic growth. Economic development plays an important role in determining a country's international competitiveness [55]. Development policy analysis helps identify areas of comparative advantage and enables countries to improve their position in the global economy, increasing their ability to compete internationally.

Therefore, this study focuses on the impact of capital market instruments such as stocks, bonds, *sukuk*, and foreign exchange on economic growth in Malaysia. The plan is to analyse and quantify the impact on key growth indicators such as GDP. It also aims to identify the most effective tools for specific objectives, such as infrastructure development or overseas investment. Additionally, this study investigates the mechanisms behind this effect by considering factors such as access to finance, risk management, and market efficiency. By comparing these results with international studies, this study provides context and broader applicability. Ultimately, the findings will be used to formulate policy recommendations to guide policymakers on how the best way is to leverage capital markets for Malaysia's sustainable and inclusive economic growth. Considering the unique characteristics of the Malaysian economy and capital market, this study will adopt a robust research methodology to ensure the credibility, generalizability, and impact of the findings.

It is critical to investigate how Malaysia's capital market instruments affect economic growth. It enhances our understanding of growth drivers and guides policy development for long-term growth. By boosting investors' confidence and assisting in the identification of issues, including systemic risks and market distortions, it increases liquidity and improves market efficiency. Additionally, by facilitating SMEs and individual access to financial markets, supporting their growth, and establishing a more equal society, this study promotes economic expansion and financial inclusivity.

The stock market is crucial to a nation's financial system and capital formation, wealth creation, and corporate governance. It enables businesses to raise money by issuing shares and supports investment, expansion, and innovation for the growth of the economy [59]. Individuals and institutions can invest in stocks and participate in company ownership through the stock market. Investors generate income when stock prices rise, which may promote consumption and investment, further fuelling economic development [22] by acquiring and selling shares. This liquidity guarantees that money is allocated to productive purposes and promotes efficient stock pricing. It enables investors to reallocate their capital in response to changing market conditions, thus boosting resource efficiency and economic efficiency [20].

Bonds are issued by governments, businesses, and other organisations to raise long-term capital. This funding option promotes infrastructure development, corporate expansion, and investment projects, all of which are critical drivers of economic growth [4]. Reference [50] claimed that joint bond funds and regional bond market linkups that follow existing trade, FDI, and bank linkages would widen financing sources, strengthen market discipline, offer market signals, and therefore boost financial stability. Reference [74] established that corporate bond market capitalisation is negatively connected to large interest rate spreads and current account openness and is directly related to economic size, the level of development of the economy and financial markets, better institutions, and interest rate volatility. Also, in the same context, [3] observed that the bond market fostering economic growth raises the appealing issue of what specific role bond markets may perform that intermediaries and stock markets cannot.

Sukuk, also known as the Islamic bond, has become well-known in the international banking industry due to its

compliance with Islamic law. According to [39], in addition to the risk-based asset-sharing principle, *Sukuk* plays an important role in facilitating infrastructure development and promoting economic growth and public goods. Reference [25] in their study established that, indeed, greater *Sukuk* markets are connected with larger economic growth, a higher number of Muslims in the population, a stronger investment profile (IP), and reduced corruption. This could be explored through this study as Malaysia is the Muslim majority country, coinciding with the statement by [25]. In another context, [24] debated that the expansion of *Sukuk* markets may have increased competition among Islamic banks, causing them to maintain lower capital ratios. Reference [63] in their study concluded that compared to the bond market, the *sukuk* market is steadier, and its validity can be ascertained through this study as it explores both the bond and *sukuk* market together.

As the largest and most liquid financial market on the planet, the foreign exchange (forex) market is very important for many things. It encourages transactions and commerce by allowing currency conversion, facilitating cross-border transactions, and ensuring the easy movement of goods and services [38]. Foreign exchange markets determine the exchange rate, which affects trade competitiveness and a country's balance of trade. It provides companies with a hedge against financial risks, exposing them to adverse changes and enhancing financial stability. Central banks and other monetary authorities use foreign currency markets to make monetary policy, regulate exchange rate fluctuations, and influence the money supply. This role illustrates the importance of currency markets for smoothing macroeconomic volatility, limiting the accumulation of financial vulnerabilities, and assisting in the achievement of inflation objectives when the efficacy of traditional monetary policy tools approaches its limitations [6]. Therefore, the objectives of this study are:

- To model stock, bond, *sukuk* and foreign exchange markets towards Malaysian economic growth using the autoregressive distributed lag (ARDL) both in the long and short run.
- Analyse the effect of stock, bond, *sukuk* and foreign exchange markets, towards Malaysian economic growth both in the long and short run by employing the ARDL method.

To achieve these objectives, this study addresses the following research questions:

- How to model stock, bond, *sukuk* and foreign exchange markets' contribution towards Malaysian economic growth using ARDL both in the long and short run?
- What are the effects of stock, bond, *sukuk* and foreign exchange markets towards Malaysian economic growth both in the long and short run through the employment of ARDL?

A. Literature Review

1) Malaysian Economic Growth: Reference [2] predicted that global economic growth is to decrease even more in 2023, owing to significant uncertainty. Aside from persistent pandemic apprehension, specifically in China, the interplay of geopolitical fragmentation heightened inflationary pressure, and the rate of monetary policy normalisation in major countries will be significant determinants of global economic activity. Meanwhile, the global capital market is projected to follow suit with this economic forecast. Malaysian economic development is expected to go forward in 2023, but at a slower rate, reflecting a more adverse global environment and domestic demand normalisation. External uncertainties continue to pose downside threats to Gross Domestic Product (GDP), and the rapidity of economic recovery will presumably remain uneven across sectors. Despite an increasingly difficult external environment, Malaysia's economy recovered significantly in 2022. Growth was supported by strong domestic demand, robust overseas expansion, and ongoing improvement in labour market conditions. Following further easing of COVID-19 limitations, the complete restoration of business operations and the return of inbound tourists contributed to underpin economic performance. Headline inflation has also risen, suggesting stronger demand and higher cost pressures. As the country moves into endemicity, real GDP rose 8.7% in 2022 [16], driven by healthy domestic demand.

2) Stock Market: Stock markets are regulated marketplaces or platforms were buyers and sellers exchange shares of publicly traded corporations. These marketplaces give investors a place to purchase and sell ownership interests in businesses, facilitating capital creation, price discovery, and liquidity [29]. According to [73], for a variety of reasons, the stock market is vital to the economy. First off, it makes it possible for businesses to raise financing, encouraging growth and employment creation. Second, it offers investment options to both private and institutional investors, enabling them to increase their wealth and financial stability. Thirdly, stock markets provide liquidity, guarantee effective resource allocation, make it simple to acquire and sell shares, and foster market efficiency. Additionally, through imposing openness and disclosure rules, stock markets support corporate governance and accountability. They act as a gauge of the state of the economy, reflecting investor mood and market circumstances. Stock markets are essential for capital production, investment, liquidity, corporate governance, and acting as a gauge of the state of the economy.

Reference [59] underlines that stock markets play a critical role in economic growth by promoting capital accumulation. Their research shows that the rise of the stock market has a positive effect on investment levels, which encourages economic growth. Furthermore, [22] stresses the importance of healthy stock markets for mobilising savings and steering them toward profitable investments. These results demonstrate how stock markets function as a tool for directing capital towards profitable endeavours, aiding in capital formation, and eventually promoting economic growth.

Stock markets are also necessary for the economically efficient allocation of resources. According to [54], the stock market encourages economic growth by enabling firms with good financial prospects to raise funds and build their businesses. In the same way, information accessibility and stock market activity have an impact on various industries, encouraging innovation, entrepreneurship, and general economic growth. Reference [12] found that stock market development in Singapore positively influences short and long-term economic growth, with capitalisation of domestic listed companies and stock turnover ratio positively impacting GDP per capita. According to [4], stock market finance is positively correlated with economic growth, suggesting that a liquid stock market facilitates efficient resource allocation. Reference [4] also describes that by giving companies a place to obtain cash for investments, a healthy stock market makes it easier for capital to be formed, which in turn promotes economic growth.

Besides, entrepreneurs can finance innovative projects by raising funds through the stock market. According to [32], stock market development supports entrepreneurship and business start-ups. According to the research conducted by [7], countries with stronger stock markets have better productivity and technological development. Furthermore, stock markets can improve financial intermediation by providing new sources of finance to firms. According to [20], a well-developed stock market can reduce a country's reliance on bank credit, thereby increasing financial stability and economic growth. According to [67], stock markets provide companies access to further funds for investment and expansion, encouraging entrepreneurship and boosting the economy.

In addition, several variables affect the relationship between stock markets and economic expansion. Reference [58] emphasises the importance of policy and regulatory framework in how the capital market affects economic growth. Better corporate governance practises are encouraged by developed stock markets, which boost company performance, draw investors, and spur growth in the economy. The relationship between stock market development and economic growth is found to be more positive in countries with greater financial security and legal rights. The nature of this relationship is greatly influenced by political stability, financial market regulation and also macroeconomic stability [22].

3) Bond Market: According to [36], bonds are the cornerstone of the global debt-capital markets, which in turn form the backbone of the global economy. Most news outlets' financial sections also state the yield at which the government's long bond closed. This coverage acknowledges that yield levels on certain government bonds serve as important economic indicators and that economic and political developments have a direct impact on bond prices. A diverse group of participants populates the bond markets. Borrowers might be business entities, local governments, public-sector organisations, and sovereign governments as they all use the bond markets to meet their financial needs.

Almost all companies have a financing structure that combines loan and equity funding. By connecting borrowers and lenders, efficient bond markets aid in capital allocation by allowing money to flow to productive industries, hence promoting economic growth [61]. Reference [4] also discussed that a thriving market for conventional bonds offers chances for long-term finance, risk management, and diversification, all of which may help the economy grow.

Previous studies have depicted few results on the effect of the bond market on economic growth. Reference [43] demonstrates that debt structure is significant to growth and emphasises the need to develop domestic bond markets to achieve long-term economic growth. Similarly, [9] achieved the same effect of the bond market on economic growth evidently from Southeastern Europe. Reference [10] also established the positive relationship but the statistically insignificant effect of the bond market on economic growth. According to [69] revealed that government bond capitalisation shows a positive effect on economic growth while corporate bond capitalisation depicted negative effects on economic growth. Reference [52], in their study using the panel data set of 38 countries, also established that government bonds have a positive relationship with economic growth, but corporate bonds' impacts shift from negative to positive as domestic financial systems grow and diversity. In the same context, [15] their research also found strong evidence that the global financial crisis skewed the connection between bond market expansion and economic growth: before the crisis, the bond market had a positive influence on economic growth; after the crisis, the evidence is ambiguous.

4) Sukuk Market: Sukuk are expanding across the Islamic world and are currently the primary source of capital flows and a significant source of debt financing for businesses and governments. It has emerged as a key tool for debt financing of capital required for global industrialisation and economic growth. In addition to its liquidity, tradability, flexibility in form, and rateability, *sukuk* has emerged as the preferred capital instrument for both investors and issuers due to its distinctive qualities of underlying assets that are compliant with Islamic principles [70].

The prohibition of interest (*riba*) and the avoidance of speculative deals (*gharar*) make *sukuk* attractive to ethical and socially responsible investors who are looking for investments that align with their values. *Sukuk* can help to boost financial inclusion by allowing a broader variety of investors, particularly retail investors, to engage in Islamic financing. Incorporating a larger portion of society in economic activity fosters inclusive economic growth [76].

Evidence from previous studies has shown the importance of *sukuk* on economic growth. Reference [34], in his study found that *sukuk* finance has been shown to stimulate economic growth in Southeast Asia, reflecting the substantial significance of Islamic financial markets of *Sukuk* as a critical contributor to economic progress. Besides, [26] in their research established substantial and comprehensive evidence that *sukuk* market expansion promotes economic growth, even after adjusting for numerous metrics of financial market development, institutional quality, and traditional economic growth factors. Even so, [5] achieved results from their study that indicate that *sukuk* financing has little effect on Gulf Cooperation Council (GCC) economic development. Despite that, [66] concluded in their study that there exists a long-term cointegration of *sukuk* market development and economic growth.

In the same context, [18], in their study, established that *sukuk* does not have any effect on Indonesia's economic growth in the short term. Lastly, to conclude the findings from a previous study, [42] established that only economic expansion has a positive substantial link with *sukuk* market development and has the largest effect on *sukuk* market development.

5) Foreign Exchange Market: Forex, also known as foreign exchange, is a decentralised global marketplace for buying and selling currencies. Various participants can exchange currencies at an agreed-upon exchange rate, including banks, financial institutions, corporations, and individuals. Different time zones are able to trade continuously on the forex market 24 hours a day [30]. Businesses and individuals may manage currency risks via the forex market. Companies involved in international commerce can reduce the impact of exchange rate variations on their operations and financial performance by hedging their currency exposure with various forex products such as forward contracts and options [29]. Central banks use the currency market to execute monetary policy. They may interfere in the forex market in order to affect exchange rates, control liquidity, and keep prices

stable. Central banks can use forex market activities to stabilise the native currency and manage inflation [21].

The efficient functioning of forex markets is crucial for economic growth and stability worldwide. Reference [8], in his study on Sierra's real exchange rate behaviour and economic growth, established that the real effective exchange rate is positively correlated to economic growth with a statistically significant coefficient. Similarly, [14] also found in their study that the exchange rate has a positive effect on economic growth.

A multiple regression analysis suggests foreign direct investment and exchange rate affect Bangladesh's economy significantly. Inflation, foreign direct investment, and exchange rate positively impact economic growth, whereas unexpected events like Covid-19, natural disasters, etc., negatively impact it [41]. Nevertheless, [44], who studied the relationship between exchange rate and economic growth in Türkiye by utilising the Johansen cointegration test, Granger causality test and Innovation Accounting Techniques, established that there exists a negative causal relationship between exchange rate and economic growth empirically. According to the analysis by [53], intervention in foreign exchange naturally stabilises the national economy by reducing the changeability of employment and production. Reference [62] in their study shows that while increasing foreign exchange reserves may reduce consumption, they can also boost investment and economic development.

II. THE MATERIAL AND METHOD/ALGORITHM

TABLE I. DATA DESCRIPTION

Variable	Proxy	Definition	Source of data
Malaysian economic growth	Gross domestic product per capita at current price (GDPPCCP) [in RM]	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or for the depletion and degradation of natural resources.	Knoema database
Stock market	FTSE Bursa Malaysia KLCI Index (FBMKLCI) [Index]	FBMKLCI is based on the top 30 companies based on market capitalisation that meets free float liquidity requirements, providing investors with a highly investable and tradable index. FTSE will calculate the Index, which will be updated in real-time every 15 seconds.	Yahoo! Finance
Bond market	New issuance of corporate bonds [in RM]	Corporate bonds issued by corporations	Fully Automated System for Issuing/Tendering (FAST) website by Bank Negara Malaysia (BNM)
Sukuk market	New issuance of corporate *sukuk* [in RM]	Islamic bonds issued by corporations	FAST by BNM
Foreign exchange market	Currency exchange rate of MYR-USD [in RM]	The MYR-USD currency exchange rate expresses the value of one United States Dollars (USD) in terms of Malaysian Ringgit (MYR)	Fusion Media's Investing.com website
Unemployment rate	Unemployment rate [in %]	The unemployment rate is the proportion of the unemployed population to the total population in labour force. This rate measures the percentage of the unemployed population in labour force. The unemployment rate is computed by using the formula number of unemployed persons divided by the number of persons in the labour force times 100.	Department of Statistics Malaysia (DOSM)

Referring to Table 1, the period of the quarterly time series data studied is within 13 13-year period, which is through the Q12010 - Q42022 in Malaysia, a total of 52 data observations. Data representing Malaysian economic growth and gross domestic product (GDP) per capita at current prices were extracted from the Knoema database. Meanwhile, data representing the stock market, specifically the FTSE Bursa Malaysia KLCI Index (FBMKLCI), were extracted from the Yahoo Finance website. In contrast, data representing the bond market and *sukuk* market, with proxies of new issuances of corporate bonds and new issuances of corporate *sukuk*, respectively, were extracted from the Fully Automated System for Issuing/Tendering (FAST) website by Bank Negara Malaysia (BNM). Additionally, data representing the foreign exchange market, specifically the MYR-USD currency exchange rate, were extracted from Fusion Media's Investing.com website. Data for the control variable, the unemployment rate, were extracted from the Department of Statistics Malaysia (DOSM).

Furthermore, this study utilises one control variable: the unemployment rate. According to [37], the inclusion of control variables in an empirical model is theoretically justified for two reasons. First, it enhances the accuracy of the estimated coefficients and allows for better causal interpretability. Second, although the control variables may not correlate with the proposed independent variables, they are believed to be significant explanatory factors for the dependent variable. By accounting for statistical noise in the dependent variable, their

incorporation into the model improves the accuracy of the estimated coefficients of the proposed effects.

A. Stationary Test

The stationarity test is an important pre-step in using the ARDL test. This test involves testing each variable for unit roots to determine their order of integration—whether a variable is integrated at the level order, I(0), first order, I(1), or second order, I(2). Common unit root tests usually practiced by researchers include the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, which are typically conducted using statistical software packages.

This study will employ the ADF test to assess the stationarity of the variables used: stock, bond, *sukuk*, and forex markets. Before running the unit root test, the optimal lag length is selected through the vector autoregressive test. This study employs the Akaike Information Criterion (AIC) for lag length selection, where the optimal length is determined by selecting the highest negative value. EViews employs AIC for model estimation by considering the trade-off between model fit and complexity. As per the 1987 convention set by Akaike, EViews modifies this criterion for factor analysis models by deducting the value for the saturated model. The information criteria for equation systems are computed using the complete system log-likelihood, assuming the data follows a multivariate normal (Gaussian) distribution based on the log-likelihood value.

The ADF test ensures that the null hypothesis is accepted unless there is a solid reason for rejecting it in favor of the alternative stationarity hypothesis. The ADF testing approach uses the Ordinary Least Squares (OLS) method to determine the coefficients of the selected model while applying AIC for optimal lag length selection, adhering to the hypotheses:

H_0 : the variable has a unit root (non-stationary)

H_a : the variable does not have a unit root (stationary)

Using the p-value and t-statistics computed and compared with the appropriate critical value, the significance of the coefficients is determined in focus. Suppose the t-statistic or the p-value is less than the critical value. In that case, the null hypothesis is rejected, following the t-distribution critical value that depends on the sample size and desired significance level for the t-statistic and 5% significance level for the p-value. If the results show that a variable is non-stationary the series is further tested at the first and second difference orderly [60]. Theoretically, the ADF stationarity test can be written as follows:

$$\Delta Y_t = \alpha + \beta_t + \gamma Y_{t-1} + \delta_1 \Delta Y_{t-1} + \delta_2 \Delta Y_{t-2} + \cdots + \delta_p \Delta Y_{t-p} + \varepsilon_t \quad (1)$$

where,

$t = 1, 2, \ldots, T$,

ΔY_t is the first difference of the dependent variable Y at time t,

α is the intercept term, representing the constant drift in the series,

β_t is the time trend term, capturing a linear trend over time,

γ is the coefficient of the lagged dependent variable (Y_{t-1}),

δ_t is the coefficients of the p lagged differences of $Y(\Delta Y_{t-1})$,

ε_t is the error term, assumed to be white noise (serially uncorrelated and normally distributed),

p is the lag order, denoting the number of lagged differences included.

B. ARDL Model Specification

According to [19], when working with variables that are integrated into various orders—I(0), I(1), or a mix of both—ARDL cointegration and bound test approach is preferred. It is also reliable when there is just one long-term link between the underlying variables in a small sample size. The general formula below (2) is an ARDL model with a dependent variable y_t and k independent variables $x_{1t}, x_{2t} \ldots x_{kt}$, where

$$y_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i y_{t-i} + \sum_{j=1}^{q_1} \beta_{1j} x_{1,t-j} + \sum_{j=1}^{q_2} \beta_{2j} x_{2,t-j} + \cdots + \sum_{j=1}^{q_k} \beta_{kj} x_{k,t-j} + \varepsilon_t \quad (2)$$

α_0 is the intercept (constant term),

α_i are the coefficients of the lagged values of y, with p being the maximum lag order of the dependent variable,

$\beta_{1j}, \beta_{2j}, \ldots, \beta_{kj}$ are the coefficients of the lagged values of the independent variables $x_{1t}, x_{2t}, \ldots, x_{kt}$ with $q_1, q_2, \ldots, q_k$ representing their respective maximum lag orders and

ε_t is the error term.

A natural logarithm is applied to put all data on comparable values for the purpose of linearity. Therefore, the long-run impact ARDL model is specified in Equation (3) as:

$$LGDPPCCP_t = \theta_1 + \theta_2 LFBMKLCIIDX_t + \theta_3 LCORPBOND_t + \theta_4 LCORPSUKUK_t + \theta_5 LMYRUSD_t + \theta_6 LUNEMPLOYMENT_t + \mu_t \quad (3)$$

where

$t = 1, 2, \ldots, T$,

LGDPPCCP represents the natural logarithm of the GDP per capita at current price,

LFBMKLCIIDX represents the natural logarithm FBMKLCI index,

LCORPBOND represents the natural logarithm of the total of new issuance of conventional bonds issued by corporations,

LCORPSUKUK stands for the natural logarithm total of new issuance of Islamic bonds, *sukuk*, issued by corporations,

LMYRUSD represents the natural logarithm of the MYR-USD currency exchange rate,

LUNEMPLOYMENT represents the natural logarithm of the control variable, unemployment rate, and

μ is the error term.

Meanwhile, the short-run impact of the ARDL model is specified in Equation (4) as:

$$\Delta LGDPPCCP_t = \alpha_1 + \sum_{i=1}^{n} \beta_i \, \Delta LFBMKLCIIDX_{t-i} + \sum_{i=1}^{n} \beta_i \, \Delta LCORPBOND_{t-i} - \sum_{i=1}^{n} \beta_i \, \Delta LCORPSUKUK_{t-i} + \sum_{i=1}^{n} \beta_i \, \Delta LMYRUSD_{t-i}$$

$$-\sum_{i=1}^{n} \beta_i \, \Delta LUNEMPLOYMENT_{t-i} + \mu_t \quad (4)$$

where

$t = 1, 2, \ldots, T,$

α is the intercept term, representing the constant drift in the series,

β_i are the coefficients of the lagged dependent variable, reflecting the short-run adjustment towards long-run equilibrium,

ΔLGDPPCCP represents the difference in the natural logarithm of the GDP per capita at the current price,

ΔLFBMKLCIIDX represents the differences between the natural logarithm FBMKLCI index,

ΔLCORPBOND represents the difference in the natural logarithm of the total new issuance of conventional bonds issued by corporations,

ΔLCORPSUKUK stands for the difference of natural logarithm total of new issuance of Islamic bonds, *sukuk*, issued by corporations,

ΔLMYRUSD represents the difference in the natural logarithm of the MYR-USD currency exchange rate,

ΔLUNEMPLOYMENT represents the difference in the natural logarithm of the control variable, unemployment rate,

μ is the error term.

The bound test checks the association of the F- and t-statistics with the lower I(0) and upper I(1) critical value bounds, based on the null hypothesis of "no levels relationship between the dependent variable and independent variables in the model," with the critical values referenced from [49]. This study also employs the error correction model (ECM) test, which computes the speed at which a cointegrating relationship adjusts to equilibrium, denoted as CointEq. Generally, a negative and highly significant coefficient is expected if the variables are cointegrated.

C. Diagnostic Test

The last step involves performing diagnostic checks to confirm the model's validity and dependability. Econometrics and statistical analysis require diagnostic tests in order to evaluate model assumptions, discover violations, provide appropriate statistical inference, and enhance model specifications [13][30][73]. The tests can be used to determine if a model meets linearity, homoscedasticity, independence, and residual normality assumptions. An estimation that violates these assumptions can lead to erroneous conclusions and unreliable forecasts. This study employs five types of diagnostic tests, including,

- serial correlation Breusch-Godfrey Lagrange multiplier (LM) test for testing general autocorrelation in residuals and help determine its independence,
- Breusch-Pagan-Godfrey (BPG) heteroskedasticity test [33][68] for checking heteroskedasticity condition in the residuals with the inclusion of lagged squared residuals,
- autoregressive conditional heteroskedasticity (ARCH) test focusing on volatility in residuals,
- Jarque-Bera (JB) normality test for checking the distribution of residuals and
- Ramsey's regression specification error test (RESET) test for checking omitted variables, incorrect functional form, and correlation between independent variables and disturbance vector, hinting at any misspecification of the model which occurs when the chosen model does not align with the actual relationship of the data [28].

These diagnostic tests are concluded with the cumulative sum (CUSUM) of the recursive residuals test and CUSUM of squares test [57], both to check for parameter instability and detect structural breaks, hinting at changes in the relationship between dependent and independent variables over time but CUSUM of squares hinting at the changes in the variance of residuals. In short, these tests are important in ensuring the validity and reliability of the estimated variables in the model selected.

III. DISCUSSION

TABLE II. SUMMARY OF DESCRIPTIVE STATISTICS

	GDPPCCP	UNEMPLOYMENT	FBMKLCIIDX	CORPBOND	CORPSUKUK	MYRUSD
Mean	314239.93	3.46	1638.66	1532827903.85	1161961538.46	3.79
Median	306654.39	3.30	1638.58	1066500000.00	684000000.00	4.03
Maximum	467305.70	5.10	1871.52	10426000000.00	7436000000.00	4.64
Minimum	196650.00	2.70	1346.38	0.00	0.00	3.02
Std. Dev.	71034.46	0.58	137.00	1860232753.49	1435294489.99	0.52
Skewness	0.20	1.51	-0.03	2.64	2.12	-0.26
Kurtosis	2.12	4.31	2.24	12.07	8.81	1.46
Observations	52	52	52	52	52	52

Table 2 provides a summary of the descriptive statistics of the variables from Q1 2010 to Q4 2022, resulting in 52 sample observations calculated directly from the original data, offering insights into each variable's distribution and key parameters. The average GDP per capita at current prices (GDPPCCP) recorded is RM314,239.93 million, ranging from a low of RM196,650 million to a high of RM467,305.7 million. A high unemployment rate was recorded in Q1 2020 at 5.10%, owing to the coronavirus disease 2019 (COVID-19) pandemic, which directly impacted global economic activities.

Notably, among the variables, new issuances of corporate bonds (CORPBOND) and corporate *sukuk* (CORPSUKUK) recorded distinct mean and median values: CORPBOND at RM1.53 billion and RM1.07 billion, respectively, and

CORPSUKUK at RM1.16 billion and RM0.684 billion, respectively. This suggests an asymmetrical distribution, indicating the potential presence of outliers. In addition to the issue of missing data for the extracted transactional data—i.e., CORPBOND and CORPSUKUK—the imputation approach is employed to replace the missing data with its median rather than the mean, owing to the potential presence of outliers in mean values. Missing data in research can reduce statistical power and lead to biased estimates, requiring careful handling to prevent invalid conclusions [23].

The skewness of the FTSE Bursa Malaysia KLCI Index (FBMKLCIIDX) and the exchange rate of MYR-USD (MYRUSD) is -0.03 and -0.26, respectively, suggesting a left-skewed distribution. This indicates that there are more negative returns than positive returns for the stock market and that the MYR frequently depreciated from Q1 2010 to Q4 2022.

COVID-19 infection in adults can range from asymptomatic infection to mild respiratory symptoms to severe pneumonia with acute respiratory distress syndrome (ARDS) and multiorgan failure [3]. The majority of patients (about 80%) fall into category 1 (asymptomatic) or category 2 (mild disease), which are usually managed in quarantine centers or at home [6]. Typical symptoms of acute COVID-19 infection include lethargy, fever, cough, and shortness of breath, and the treatment is mainly conservative [3].

TABLE III. CORRELATION MATRIX

	LGDPPCCP	**LUNEMPLOYMENT**	**LFBMKLCIIDX**	**LCORPBOND**	**LCORPSUKUK**	**LMYRUSD**
LGDPPCCP	1.0000	0.5805	0.0171	-0.0958	-0.1852	0.8784
LUNEMPLOYMENT	0.5805	1.0000	-0.4187	-0.1535	-0.1732	0.6235
LFBMKLCIIDX	0.0171	-0.4187	1.0000	0.1995	-0.0167	-0.0456
LCORPBOND	-0.0958	-0.1535	0.1995	1.0000	0.0649	-0.0703
LCORPSUKUK	-0.1852	-0.1732	-0.0167	0.0649	1.0000	-0.3248
LMYRUSD	0.8784	0.6235	-0.0456	-0.0703	-0.3248	1.0000

Meanwhile, Table III shows the correlation matrix between each variable. The correlation matrix is based on log-transformed data, as this transformation is important to ensure that the linearity and homoscedasticity assumptions underlying the correlation analysis are met, as suggested by [47]. The correlation matrix shown in Table III displays a strong positive correlation between LGDPPCCP and LMYRUSD at 0.8784, which is closest to 1, LUNEMPLOYMENT and LMYRUSD at 0.6235, which is relatively close to 1, and LGDPPCCP and LUNEMPLOYMENT at 0.5805, which is moderately close to 1. This implies that a higher value of the Malaysian Ringgit relative to the U.S. dollar is strongly related to higher GDP per capita at current prices and a higher unemployment rate. In contrast, an increase in GDP per capita is moderately related to a higher unemployment rate. Apart from that, LFBMKLCIIDX and LUNEMPLOYMENT show the highest negative correlation at -0.4187, which is fairly close to -1. This implies an inverse relationship between the stock market and the unemployment rate, where peak performance in the stock market may be associated with a lower unemployment rate.

TABLE IV. UNIT ROOT TEST

	Level		***First difference***	
	I	**I & T**	**I**	**I & T**
LGDPPCCP	-0.6168	-3.8194	-6.6072*	-6.5194
LUNEMPLOYMENT	-1.5449	-2.5213	-6.3444*	-6.2777
LFBMKLCIIDX	-2.2537	-2.5976	-9.1996*	-9.8812
LCORPBOND	-8.8322*	-9.0214	*NA*	*NA*
LCORPSUKUK	-3.2451**	-3.4115	*NA*	*NA*
LMYRUSD	-0.9363	-2.1859	-5.9155*	-5.8263
Notes: * and ** are 1% and 5% significance levels, respectively. I and I & T are the specifications of the ARDL with intercept and intercept and trend, respectively.				

Table 4 presents the results of the stationarity test or unit root test using the Augmented Dickey-Fuller (ADF) method on the variables at level, I(0), and first difference order, I(1). A lag length of 2 is chosen, considering two quarters as relevant for predicting the current observation. This selection is made by simultaneously conducting the unit root test, where all variables are found to be integrated at I(0) and I(1) at lag length 2. With the obtained t-statistic values being lower than the t-distribution critical values in Appendix I, all variables are confirmed to be integrated at a combination of both I(0) and I(1). Specifically,

LCORPBOND and LCORPSUKUK are stationary at I(0) with values of -8.8322 and -3.2451, respectively, while LGDPPCCP, LUNEMPLOYMENT, LFBMKLCI, and LMYRUSD are stationary at I(1) with values of -6.6072, -6.3444, -9.1996, and -5.9155, respectively.

TABLE V. THE BOUND TEST FOR COINTEGRATION

Model	Dependent variable: LGDPPCCP	Calculated F-statistics	Critical bound values, sample size = 50				
					1%	5%	10%
1	f(LFBMKLCIIDX, LCORPBOND, LCORPSUKUK, LMYRUSD, LUNEMPLOYMENT)	6.4202	*k=5*	*I(0)*	3.5930	2.6700	2.2590
				I(1)	4.9810	3.7810	3.2640

Table V depicts the bound test for cointegration, employing the estimation of ARDL. The value of F-statistics, 6.2790, is evidently higher than the upper bound, 4.9810 and simultaneously higher than the lower critical bound, 3.5930, indicating the existence of cointegration between LGDPPCCP, DLFBMKLCI, LCORPBOND, LCORPSUKUK and DLMYRUSD. k is the number of regressors involved, which are the independent variables. This result is owing to the estimation of Equation (1) using the maximum lags of two on each variable.

TABLE VI. THE LONG-RUN, SHORT-RUN ESTIMATION, AND DIAGNOSTIC TEST

Dependent variable: LGDPPCCP				
Variables	**Coefficient**	**Std Error**	**t-statistics**	**Probability**
Panel A: ARDL long-run coefficients				
LUNEMPLOYMENT(-1)	0.4540	0.2344	1.9367*	0.0592
LFBMKLCIIDX(-1)	0.1579	0.3535	0.4468	0.6572
LCORPBOND(-1)	-0.0832	0.0504	-1.6515	0.1058
LCORPSUKUK	-0.0123	0.0275	-0.4491	0.6556
LMYRUSD	0.9036	0.2469	3.6602***	0.0007
C	11.7947	2.9802	3.9577***	0.0003
Dependent variable: DLGDPPCCP, Model 1: ARDL (1, 2, 1, 2, 0, 0)				
Variables	**Coefficient**	**Std Error**	**t-statistics**	**Probability**
Panel B: ARDL short-run coefficients				
LGDPPCCP(-1)*	-0.1929	0.0467	-4.1308***	0.0002
LUNEMPLOYMENT(-1)	0.0876	0.0460	1.9031	0.0646
LFBMKLCIIDX(-1)	0.0305	0.0690	0.4417	0.6612
LCORPBOND(-1)	-0.0160	0.0095	-1.6878	0.0996
LCORPSUKUK**	-0.0024	0.0051	-0.4698	0.6412
LMYRUSD**	0.1743	0.0750	2.3229**	0.0256
D(LUNEMPLOYMENT)	-0.0836	0.0805	-1.0379	0.3059
D(LUNEMPLOYMENT(-1))	-0.4598	0.0775	-5.9322***	0.0000
D(LFBMKLCIIDX)	-0.4813	0.1380	-3.4866***	0.0013
D(LCORPBOND)	0.0048	0.0046	1.0476	0.3014
D(LCORPBOND(-1))	0.0116	0.0046	2.5123**	0.0164
COINTEQ*	-0.1969	0.0276	-7.1339***	0.0000
C	2.2748	0.6875	3.3085***	0.0021
Variables	**Coefficient**		**Probability**	
Panel C: Diagnostic tests				
LM (2)	11.6846		0.0029	
BPG (11)	15.8727		0.1459	
ARCH (2)	1.5770		0.4545	
JB	1.4832		0.4764	
RESET (2,36)	0.2092		0.8122	

Notes: ***, ** and * are 1%, 5% and 10% significance levels, following values of |2.763|, |2,228|, |1,833| respectively. The probability, *p*-value does not account for model selection. ** are zero-lag variables.

Table 6 presents the long-run and short-run estimations, along with the diagnostic test results of this study. The best model is selected automatically using the Akaike Information Criterion (AIC), computed through the simple least squares method, where the model with the lowest criterion value is chosen. According to the long-run estimation in Panel A, the obtained results align closely with expectations, as the independent variables LFBMKLCIIDX and LMYRUSD have positive coefficient signs [64][75], with values of 0.1579 and 0.9036, respectively. However, only LMYRUSD is statistically significant, with a t-value of 3.6602 at the 1% significance level. The negative coefficient signs for LCORPBOND (-0.0832) and LCORPSUKUK (-0.0123) indicate their effect on LGDPPCCP. Specifically, focusing on corporate bonds, the results contradict [52] but align with [69]. However, when considering the bond market more generally, the findings for LCORPBOND resemble those in [43]. At the same time, the effect of corporate *sukuk* on economic growth in the long run is similar to [66] but contradicts [26]. Additionally, both LCORPBOND and LCORPSUKUK are statistically insignificant in the long run. The unexpected positive coefficient for LUNEMPLOYMENT (0.4540), which is statistically significant at the 10% level, suggests that a 1% increase in the unemployment rate while holding other variables constant, may lead to a 45.4% increase in GDP per capita at current prices. Given that historically, higher unemployment has been linked to economic downturns and lower GDP, this conclusion may seem contradictory. However, this effect could be attributed to the COVID-19 pandemic, where the high unemployment rate during the crisis may have influenced the results. Furthermore, this study considers the possibility that other factors, such as exports or favorable trade conditions, might act as omitted variables influencing these findings. This is further supported by the high positive coefficient of C (11.7947), representing constant variables, which is also statistically significant at the 1% level. This results in the long run equation, Equation (4) as:

$$LGDPPCCP_t = 11.4947 + 0.9036\, LMYRUSD_t + 0.4540\, LUNEMPLOYMENT_t + \mu_t \quad (4)$$

Addressing Objective 1 for the long-run effect, the results indicate that only the variables representing the foreign exchange market and the unemployment rate can be modeled in relation to Malaysian economic growth using the ARDL approach. Meanwhile, addressing Objective 2 for the long-run effect, the results suggest that the foreign exchange market and the unemployment rate have positive effects on Malaysian economic growth through the application of ARDL. Moving forward, the short-run estimation in Model 1, as presented in Table 6, depicts similar results to the long-run estimation, with positively signed coefficients. LCORPBOND (0.0048) and LMYRUSD (0.1743) are both statistically significant at the 5% significance level, while LFBMKLCIIDX (-0.4813) and LCORPSUKUK (-0.0024) negatively impact LGDPPCCP. Among these, LFBMKLCIIDX is statistically significant at the 1% significance level, whereas LCORPSUKUK is statistically insignificant. On the other hand, LUNEMPLOYMENT does not reflect the same result as in the long-run estimation, showing a negative coefficient of -0.4598 and being statistically significant in the short run at the 1% significance level, which enhances confidence in the model. This implies that a 1% increase in the unemployment rate while keeping other variables constant, may lead to a 45.98% decrease in economic growth This results in short-run given in Equation (5) following Equation (3) as follows:

$$\begin{aligned}\Delta LGDPPCCP &= 2.2748 \\ &\quad - \sum_{i=1}^{n} 0.4813_i\, \Delta LFBMKLCIIDX_{t-i} \\ &\quad + \sum_{i=1}^{n} 0.0116_i\, \Delta LCORPBOND_{t-i} \\ &\quad + \sum_{i=1}^{n} 0.1743_i\, \Delta LMYRUSD_{t-i} \\ &\quad - \sum_{i=1}^{n} 0.4598_i\, \Delta LUNEMPLOYMENT_{t-i} \\ &\quad + \mu_t \end{aligned} \quad (5)$$

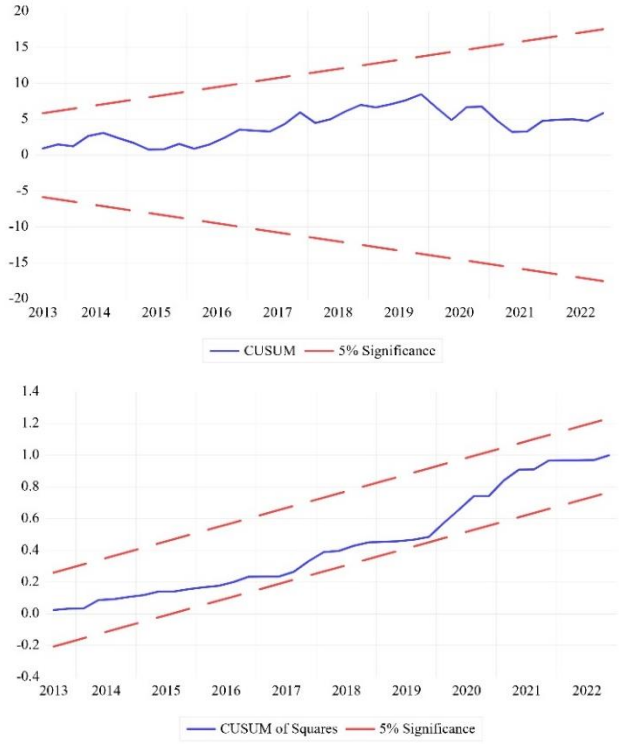

Figure 1. CUSUM and CUSUM squared

Addressing Objective 1 for the short-run effect, the results indicate that only the variables representing the stock market, bond market, foreign exchange market, and the unemployment rate can be modeled in relation to Malaysian economic growth using the ARDL approach. Meanwhile, addressing Objective 2 for the short-run effect, the results suggest that the stock market has a negative effect on Malaysian economic growth. In contrast, the bond market, foreign exchange market, and unemployment rate have positive effects through the application of ARDL.

The error correction model (ECM) coefficient for Model 1 is statistically significant at the 1% level, with a value of -0.1969, indicating a 19.69% speed of adjustment to equilibrium in the cointegrating relationship. Strong evidence of a cointegrated

relationship between variables is interpreted in the presence of a negative and statistically significant error correction term [48].

Advancing to Table 5, the results from the diagnostic tests are presented, including the Breusch-Godfrey Lagrange Multiplier (LM) test for serial correlation, the Breusch-Pagan-Godfrey (BPG) test for heteroskedasticity, the autoregressive conditional heteroskedasticity (ARCH) test, the Jarque-Bera (JB) normality test, and Ramsey's Regression Specification Error Test (RESET). The LM test shows a p-value < 5% (0.0029), indicating the rejection of the null hypothesis, suggesting that the residuals are serially correlated and not independent, in line with general heteroskedasticity checking. Meanwhile, the other tests—BPG, ARCH, JB, and RESET—yield p-values > 5%, indicating the failure to reject the null hypothesis, confirming that the residuals are homoscedastic, normally distributed and that the model is correctly specified, with p-values of 0.1459, 0.4545, 0.4764, and 0.8122, respectively.

Conversely, in Figure 1, the plots of cumulative sum (CUSUM) and CUSUM of squares for the recursive residuals test for Model 1 (blue line) remain within the upper and lower 5% critical bounds (red line), confirming the stability of the parameters and indicating that the changes in the relationship between the dependent and independent variables over time are valid and reliable.

IV. ROBUSTNESS CHECKS

This section aims at checking the robustness of the Model 1 chosen in Results & Discussion by replacing the variables LCORPBOND and LCORPSUKUK with LCBS, which stands for the cumulative of LCORPBOND and LCORPSUKUK. The purpose of running a robustness check utilising a new set of ARDL models is to explore alternative specifications to assess that the observed relationship in Model 1 holds across different market conditions, in this case, LCBS, which ensures that the conclusion of this study is not sensitive to specific modelling choices making it more reliable, increasing Model 1's applicability and impact.

TABLE VII. THE BOUND TEST FOR COINTEGRATION: AN ALTERNATIVE MEASURE

Model	**Dependent variable: LGDPPCCP**	**Calculated F-statistics**	**Critical bound values, sample size = 50**		**1%**	**5%**	**10%**
2	f(LUNEMPLOYMENT, LFBMKLCIIDX, LCBS, LMYRUSD)	6.1336	*k=4*	*I(0)*	3.8450	2.8230	2.3720
				I(1)	5.1500	3.8720	3.3200

Table 7 presents the bound test for cointegration, employing the estimation of ARDL. The F-statistic value of 6.1336 is evidently higher than the upper bound (5.1500) and simultaneously higher than the lower critical bound (3.8450), clearly indicating the existence of cointegration between LGDPPCCP, DLFBMKLCI, LCBS, and DLMYRUSD. The variable k represents the number of regressors involved, which are the independent variables.

Table 8 presents improved results, with all variables having positively signed coefficients in the long run. Similarly, LUNEMPLOYMENT reflects the results from Model 1, with a positive coefficient (0.4697) and statistical significance, implying that a 1% increase in the unemployment rate, while keeping other variables constant, may lead to a 46.97% increase in GDP per capita at current prices. Given this mirroring result, this study acknowledges the existence of omitted variable bias, which may influence the impact of unemployment on economic growth in the long run. Other variables, LFBMKLCI (0.0649), LCBS (0.0091), LMYRUSD (1.0372), and the constant variable C (10.0978), show a positive impact on economic growth (LGDPPCCP). At the same time, only LMYRUSD and C are statistically significant at the 1% level, with values of 4.4266 and 3.4390, respectively. These results indicate that a 1% increase in stock market performance, cumulative new issuance of corporate bonds and *sukuk*, or the MYR-USD exchange rate increases economic growth by 6.49%, 0.91%, and 103.72%, respectively.

Moving forward, the short-run estimation in Model 2 depicts that LUNEMPLOYMENT (-0.5201) and LFBMKLCI (-0.3752) negatively impact DLGDPPCCP and are statistically significant at the 1% and 5% levels, with values of -6.4266 and -2.5652, respectively. Meanwhile, LCB (0.2032) and LMYRUSD (0.2032) positively impact DLGDPPCCP, but only LMYRUSD is statistically significant (2.8064) at the 1% level. The error correction model (ECM) coefficient for Model 2 is statistically significant at the 1% level, with a value of -0.1959, indicating a 19.59% speed of adjustment to equilibrium in the cointegrating relationship.

Advancing to Table 8, the results from the diagnostic tests are presented, including the Breusch-Godfrey Lagrange Multiplier (LM) test for serial correlation, the Breusch-Pagan-Godfrey (BPG) test for heteroskedasticity, the autoregressive conditional heteroskedasticity (ARCH) test, the Jarque-Bera (JB) normality test, and Ramsey's Regression Specification Error Test (RESET). Based on the test values—LM (0.0004), BPG (0.0436), ARCH (0.8056), JB (0.5957), and RESET (0.7943)—it is concluded that the residuals are normally distributed, homoscedastic, and that the model is correctly specified. However, the residuals exhibit serial correlation, are not independent, and are heteroskedastic when tested with the inclusion of lagged squared residuals.

Similarly, in Figure 2, the CUSUM test confirms parameter stability, as Model 2's blue line remains within the 5% significance level (red line). However, the CUSUM of squares test depicts instability in parameters from Q2 2016 to Q4 2017, where the Model 2 line appears to cross the 5% significance level. This indicates that while the changes in the relationship between the dependent and independent variables over time are valid and reliable, the relationship becomes unstable when focusing on changes in residual variance.

TABLE VIII. THE LONG-RUN, SHORT-RUN ESTIMATES, AND DIAGNOSTIC TESTS: AN ALTERNATIVE MEASURE

Dependent variable: LGDPPCCP ***Model 2: ARDL (1, 2, 1, 0, 0)***				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
Panel A: Long-run coefficients				
LUNEMPLOYMENT (-1)	0.4697	0.2513	1.8688*	0.0682
LFBMKLCIIDX (-1)	0.0649	0.3713	0.1747	0.8621
LCBS	0.0091	0.0315	0.2899	0.7732
LMYRUSD	1.0372	0.2343	4.4266***	0.0001
C	10.0978	2.9362	3.4390***	0.0013
Dependent variable: DLGDPPCCP ***Model 2: ARDL (1, 2, 1, 0, 0)***				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
Panel B: Short-run coefficients				
LGDPPCCP(-1)	-0.1959	0.0466	-4.2052***	0.0001
LUNEMPLOYMENT(-1)	0.0920	0.0506	1.8171	0.0765
LFBMKLCIIDX(-1)	0.0127	0.0730	0.1741	0.8626
LCBS**	0.0018	0.0062	0.2874	0.7753
LMYRUSD**	0.2032	0.0724	2.8064***	0.0076
C	1.9785	0.7089	2.7907***	0.0079
D(LUNEMPLOYMENT)	-0.0795	0.0871	-0.9125	0.3668
D(LUNEMPLOYMENT(-1))	-0.5201	0.0809	-6.4266***	0.0000
D(LFBMKLCIIDX)	-0.3752	0.1463	-2.5652**	0.0141
COINTEQ*	-0.1959	0.0305	-6.4257***	0.0000

Variable	**Coefficient**	***Probability***
Panel C: Diagnostic tests		
LM (2)	15.4155	0.0004
BPG (8)	15.9187	0.0436
ARCH (2)	0.4324	0.8056
JB	1.0360	0.5957
RESET (2,39)	0.2316	0.7943

Notes: ***, ** and * are 1%, 5% and 10% significance level, following values of |2.763|, |2,228|, |1,833| respectively. The probability, *p*-value does not account for model selection. ** are zero-lag variables

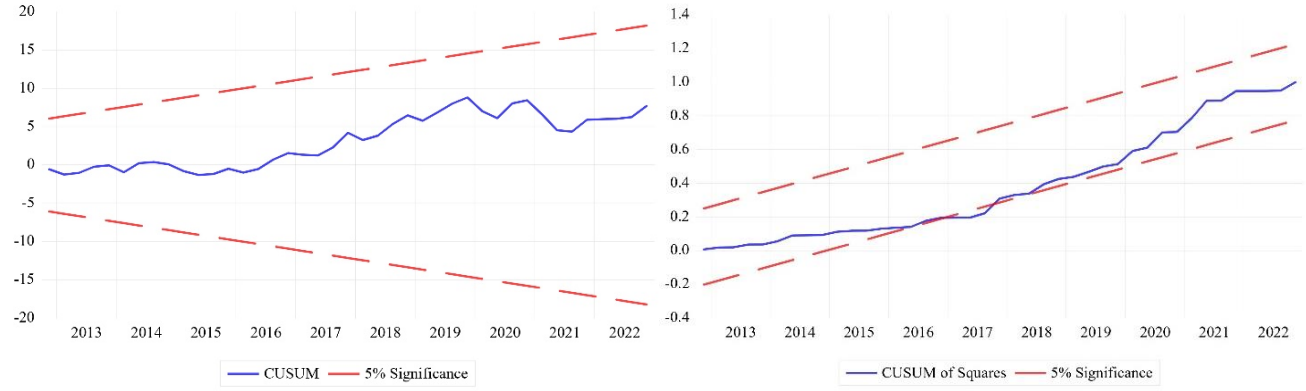

Fig. 2 CUSUM and CUSUM of squares: an alternative measure.

Robustness checks have demonstrated that the analysis findings are consistent and reliable. The cointegration of the variables is reaffirmed by alternative models that substitute LCORPBOND and LCORPSUKUK with LCBS. The general patterns and significance levels remain consistent with the preliminary findings, even though individual coefficients may vary. The model's reliability is further reinforced by diagnostic tests, including heteroskedasticity, serial correlation, and normality testing. Additionally, the robustness of the models is supported by the stability of the parameters, as shown by CUSUM plots.

However, the robustness checks may or may not serve as a strong benchmark for Model 1 estimation, depending on the traditional theoretical relationship between the unemployment rate, stock, bond, *sukuk*, and foreign exchange markets in relation to economic growth. Nevertheless, some robustness check results align with previous studies, reinforcing the model's credibility. For instance, [11] supports the positive long-run impact of the stock market, [61] confirms findings for the bond market, [75] highlights the positive influence of CBS on economic growth in the long run, and [31] provides evidence for the positive impact of the foreign exchange market.

V. CONCLUSION

The results of the cointegration test employing ARDL estimation reveal the existence of cointegration between the main variables (LGDPPCCP, DLFBMKLCI, LCORPBOND, LCORPSUKUK, and DLMYRUSD). The unemployment rate and the MYR-USD exchange rate positively impact economic growth and are statistically significant in the long run. This effect may be influenced by the COVID-19 pandemic, where high unemployment rates during the pre- and post-pandemic periods might have affected the results. Many companies laid off employees to sustain operations, retaining only skilled and high-performance workers, which could have enhanced efficiency by eliminating non-productive factors. Additionally, lower interest rates, encouraged by the government to stimulate spending and improve the economic sector, may have increased loan takeouts for consumption purposes. Furthermore, this study considers other factors, such as exports and favorable trade conditions, that might act as omitted variables influencing these results. This is also supported by the high positive coefficient of C, representing the constant variable.

In the short run, stock market performance, corporate bond issuances, the MYR-USD exchange rate, and the unemployment rate are statistically significant in promoting economic growth. However, stock market performance and the unemployment rate negatively affect economic growth, while corporate bond issuances and the MYR-USD exchange rate positively influence it. This result aligns with the findings of [17], where the U.S. stock market's performance was found to be negatively correlated with GDP growth. The author attributed this to the fact that U.S. stock performance is heavily influenced by the global technology industry.

To conclude, capital market instruments play a significant role in Malaysian economic growth, with the foreign exchange market being the primary driver in promoting economic growth in both the long and short run. Although corporate *sukuk* issuance does not significantly impact Malaysian economic growth—at least within the studied period—this study acknowledges its limitations. Corporate *sukuk* issuance alone is insufficient to determine how the *sukuk* market contributes to economic growth. Further research involving broader *sukuk* transactions may provide better insights into its relationship with economic growth, especially considering that the studied period coincides with the early development of the *sukuk* market.

Finally, as the key driver of the capital market, as identified in this study, it is recommended that the government place greater emphasis on the foreign exchange market to further bolster economic development and stability. Increased engagement in the foreign exchange market may lead to improved risk management, greater liquidity, and enhanced international competitiveness. To achieve this, the government should consider implementing policies to attract foreign capital, establishing a supportive regulatory framework, and investing in technology infrastructure to facilitate seamless foreign exchange operations. Additionally, encouraging market participants to engage in education and awareness initiatives could lead to a more knowledgeable and efficient foreign exchange market. Further studies—particularly regarding Islamic rulings—and improvements in making the foreign exchange market accessible to the broader population are essential before implementing additional policies. By prioritising these elements, Malaysia can enhance its standing in the global financial arena and leverage a robust and dynamic foreign exchange market.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

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